

Education for Wicked Problems and the Reconciliation of Opposites

A theory of bi-relational development

Raoul J. Adam



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The recognition and reconciliation of 'opposites' lies at the heart of our most personal and global problems and is arguably one of the most neglected developmental tasks of Western education. Such problems are 'wicked' in the sense that they involve real-life decisions that have to be made in rapidly changing contexts involving irreducible tensions and paradoxes. By exploring our human tendency to bifurcate the universe, *Education for Wicked Problems and the Reconciliation of Opposites* proposes a way to recognise and (re)solve some of our most wicked problems.

Applying an original theory of bi-relational development to wicked problems, Adam proposes that our everyday ways of knowing and being can be powerfully located and understood in terms of the *creation, emergence, opposition, convergence, collapse* and *transposition* of dyadic constituents such as nature/culture, conservative/liberal and spirit/matter. He uses this approach to frame key debates in and across domains of knowledge and to offer new perspectives on three of the most profound and related problems of the twenty-first century: globalisation, sustainability and secularisation.

This book is a comprehensive study of dyads and dyadic relationships and provides a multidisciplinary and original approach to human development in the face of wicked problems. It will be of great interest to students and academics in education and psychosocial development as well as professionals across a range of fields looking for new ways to recognise and (re)solve the wicked problems that characterise their professions.

Raoul J. Adam is an Adjunct Senior Lecturer in the College of Arts, Society and Education at James Cook University, Australia. He gained a PhD in Cultural-Cognitive Development from the University of Queensland in 2008 and has since lectured and researched on the cognitive-epistemic dimension of complex social problems. His lecturing was recognised by a National Citation for Teaching and Learning in 2010 and his research was supported by a fellowship with The Cairns Institute in 2014. *Education for Wicked Problems and the Reconciliation of Opposites* is his first book.

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For my teachers who are students and my students who
are teachers

Life hangs in the balance but rarely in the middle.

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Credits

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Part I

Theory

Wicked problems and the reconciliation of opposites

The recognition and reconciliation of 'opposites' lies at the heart of our most personal and global wicked problems and is perhaps the most neglected developmental task of Western education. Somewhere on this planet, at this very moment, there is an expectant couple contemplating how best to bring a child into the world (traditional/alternative), to raise it (permissive/authoritarian) and to educate it (learner-centred/teacher-centred). There is a physician considering how to treat a young woman with debilitating anxiety (mind/body). There is a businessman waiting for a train near a beggar with an outstretched hand wondering whether charity is part of the solution or part of the problem of poverty (dependence/independence). There is a young man in a prison cell reflecting on the cause of his crime (nature/nurture) and a judge deciding his sentence (punishment/rehabilitation). There is a conservative politician campaigning for war and a liberal politician campaigning for peace (war/peace, conservative/liberal). There is a group of loggers preparing to clear a forest and a group of activists who have chained themselves to its trees (develop/conserves). There is a cleric who is lamenting a faithless world and a scientist who is celebrating it (faith/reason; spirit/matter). Almost by definition, life's wickedest problems and solutions involve the expression and reconciliation of 'opposites'.

Many readers will be familiar with such pairings (i.e. *dyads*) and polarities. Rightly so, some readers will question the implicit stereotypes. Could not the scientist lament a godless world and the cleric appeal to reason? Could not the physician heal the body through the mind? Could not the conservative politician advocate for peace and the liberal politician advocate for a just war? Could not a young man's nature be his ancestors' nurture and his punishment his rehabilitation? Why associate the masculine with criminality and the feminine with anxiety? My premise is that the ways we know and live in relation to such dyads is profoundly important to the way we recognise and (re)solve wicked problems. Our ability to reconcile opposites is a developmental task that demands serious attention, especially from educators. Of course, the task is nothing new. However, the recognition and reconciliation of apparent opposites in the modern world (e.g. unity/diversity; faith/reason; develop/conserves) is more globally consequential and communicable than ever before.

Accordingly, this book introduces a bi-relational (i.e. *relations between two*) approach to wicked problems that I have, with pun on wings intended, called BirD (i.e. **Bi**-relational **D**evelopment). BirD is an attempt to map out some of our archetypal ways of knowing and being in relation to the dyads that identify our most pressing concerns. It is a representation of human development that spans from our first divisions of knowledge, through its binary oppositions, and on to our final attempts to put it back together. Such developments have much to do with the ways we recognise and (re)solve wicked problems.

A 'wicked problem' (Rittel and Webber, 1973) has no definitive formulation, no immediate or ultimate test of solution, no clear contextual delineation and is open only to (re)solving rather than final objective solutions. The concept is sometimes used interchangeably with 'ill-structured problems' (King and Kitchener, 2002; Mitroff *et al.*, 2004), 'messes' (Ackoff, 1993), and 'social messes' (Horn, 2004). King and Kitchener (2002) describe 'ill-structured problems' as those about which 'reasonable people reasonably disagree' (p. 37). The type of wicked problems I hope to identify in this book could be known more specifically as *entangled problems*, which arise at the interface of interdependent polarities. They are 'wicked' in the sense that this interface is contextually dynamic and problems must be (re)solved in context rather than solved once and for all. Such problems are perplexing; they involve paradox, dialectic and necessary tensions. There are hints and traces of the reconciliation of opposites in the literature on wicked problems. For example, in *Tackling Wicked Problems through the Transdisciplinary Imagination* Brown *et al.* (2010) write: 'In traditional research, a paradox is treated as a pair of opposites. In an open inquiry, the pairs of opposites are treated as complementary and provide a useful indicator of the heart of an issue' (p. 63). However, I am unaware of any comprehensive treatments that explore the development of such bi-relational logics in the approach to wicked problems.

The bi-relational ways we know and live in relation to wicked problems are not just academic concerns. The sample dyads in Table 1.1 relate to everyday struggles in real-world contexts. Our attempt to coordinate them is what makes us collectively human and individually and culturally diverse.

The ways we recognise and navigate between dyadic poles can see us deeply divided over the ways to raise our children (attachment/independence) and to educate them (teacher-centred/learner-centred), the ways to improve our health (natural/synthetic), run our economies (capitalist/communist), manage the planet (conservation/development), engage with nature (nature/culture), understand our histories (mythos/logos), organise our cultures (local/global), make our ultimate meanings (matter/spirit) and conceptualise our existence (birth/death). Of course, the act of living means that 'we have to draw the line somewhere' amid the wicked problems we face. The educative rationale for a bi-relational approach to wicked problems is simply that these lines can be drawn more effectively with a deeper understanding of what it is they divide.

Table 1.1 Illustrative list of dyads

Subjective/Objective	Sacred/Profane	Science/Art
Relative/Absolute	Attraction/Repulsion	Produce/Consume
Empirical/Rational	Theory/Practice	Common/Rare
Change/Stability	Complex/Simple	Formal/Casual
A posteriori/A priori	Nature/Nurture (Culture)	Explicit/Implicit
Faith/Reason	Progressive/Conventional	Cognitive/Affective
Mind/Body	Heteronymous/Homogenous	Create/Destroy
Collective/Individual	Intrinsic/Extrinsic	Innovate/Replicate
Intuitive/Rational	Descriptive/Prescriptive	Rich/Poor
Everything/Nothing	Freedom/Control	Competitive/Collaborative
Perception/Reality	Holistic/Reductive	Give/Take
Symbolic/Literal	Future/Past	General/Particular
Mythos/Logos	Chaos/Order	Love/Hate
Spirit/Matter	Justice/Mercy	Success/Failure
Synthetic/Analytic	Quality/Quantity	Pleasure/Pain
Autonomous/Dependent	Passive/Active	Defend/Attack
Immanent/Transcendent	Theism/Atheism	Agree/Oppose
Isolated/Integrated	Hierarchical/Egalitarian	Hope/Despair
Divergent/Convergent	Teach/Learn	Positive/Negative
Expansive/Reductive	Deficit/Surplus	Conflict/Peace
Abstract/Concrete	Supply/Demand	Left/Right
Self/Other	Certainty/Doubt	Natural/Synthetic
Liberal/Conservative	Similar/Different	Capitalist/Communist
Birth/Death	Masculine/Feminine	Local/Global

The preceding list is illustrative rather than exhaustive and contains structurally different types of dyads that I discuss in Chapter 3. The list is not static and fixed; rather, it is an illustrative representation of dyads from a range of contexts and domains of knowledge. The meanings of these dyads shift and change over time and in different contexts but I argue that there is currently and cross-contextually enough stability and familiarity to make them worthy topics for discussion. Accordingly, this book explores dyadic structures and relationships as they appear in the context of wicked problems. It offers an analytical framework (i.e. BirD) to map the dyads, dyadic relationships, developments and dynamics that give structure and content to our most wicked problems. And this, so that we may be more masters over, rather than mastered by, our ability to bifurcate the *universe*.

Dyads and dyadic relationships

In some ways, the possibly dense analysis that follows is but a complex elaboration of the simple insight that socio-cultural dyads require the same coordination and development of dexterity in the (re)solution of wicked problems as hands, eyes and feet in the resolution of physical problems. I argue that some

aspect of our minds is as symmetrically bifurcated as our hands, eyes and feet. This is not necessarily an optimal adaptation. Indeed, we have had a little less evolutionary time to coordinate our bifurcated minds or to evolve out of them altogether than we have had to coordinate our hands, eyes and feet, which at least are more immediately apparent than their cognitive-epistemic equivalents. However, I am purposefully slower than others have been to dismiss the bifurcation of the mind as *just* child's play. Rather, like hands, feet and eyes the bifurcated mind can enable dexterous navigation of wickedly complex mental terrains. The mental coordination of dyadic constituents or the 'reconciliation of opposites', like the physical coordination of hands, eyes and feet, is a definitive task of human development.

The ubiquity of such dyads (e.g. conservative/liberal) and dyadic relationships (e.g. binary oppositional, complementary and unitary) across almost all domains of knowledge (e.g. politics, philosophy and science) makes for a topic worthy of attention. As C. G. Jung (1991) surmised, 'The idea of the pairs of opposites is as old as the world' (p. 72). These dyads and dyadic relationships are not *just* abstract or metaphysical concerns and constructions; rather, they have concrete expressions in everyday lives. Dyads or polarities allow us to orientate ourselves – to move, to act, to choose, to know and to *be* – within the most mundane and profound domains of life. We can be taller or shorter, faster or slower, happier or sadder, for better or worse. Dyads allow us to locate our ways of knowing (i.e. epistemologies) and being (i.e. ontologies) in relation to the knowing and being of others. Dyads allow us *to be* and *to belong* in relation to the being and belonging of others. We can be apart or together, in love or in hate, included or excluded, conservative or liberal and structured or spontaneous. Dyads are enablers of difference and decision that make *knowing* powerful and *being* meaningful. We can give or take, create or destroy, analyse or synthesise and let go or hold on. Finally, we can relate dyadic constituents through opposition, complement, dialectic, negation, union and paradox. These *dyadic relationships* both create and reflect the worlds we live in, the meanings and values we make and the wicked problems and challenges we face. Dyadic relationships provide a structure for understanding the problems and challenges that give meaning to our individual and social ways of being and knowing – what I term *onto-epistemological developments*. Accordingly, my elaborative project is to sketch out some bi-relational locations and dynamics – much like a cartographer plots lines of longitude and latitude between poles – to help identify and navigate some of our most complex human terrains and wicked problems.

Of course, one cannot talk meaningfully about *two* (i.e. a dyad) without locating it among discussions of zero, one, three and infinity. Accordingly, the aim of this book is to explicate and engage an existential riddle at the core of human development:

*What becomes one
Which then becomes two*

Which then becomes something
 That is often thought of
 And may well be fought of
 As Zero
 Or One
 Or Two
 Or Three
 Or even by some
 As In-fin-ity?

(Note that I have used capitalisation to emphasise a more developed or encompassing way of knowing a concept, e.g. *One* rather than *one*.) Riddle-solving is, of course, a ridiculously serious business, and I think it is fair to say that nihilists, monists, dualists, triadists, multiplists and infinitarians have contested their solutions to this wicked problem as much with the sword as with the stylus since knowing and being began. Indeed, such contestations are as modern as they are ancient.

Twenty-two centuries ago the Eastern philosopher Lao Tzu grappled with the number of reality:

One produces two
 Two produce three
 Three produce myriad things

(2006, Ch. 42)

In the fifteenth century, German philosopher Nicholas Cusa examined the coincidence of opposites, which he coined *coincidentia oppositorum*. In the last century, Jung appropriated the same term and observed, 'One is not a number; the first number is two, and with it multiplicity and reality begin' (1970, p. 462). Early in our own century, neuroscientists examined the neurobiological correlates of the experience of 'oneness' and posited the existence of a 'binary operator' in the left inferior parietal lobe of the human brain (Newberg *et al.*, 2001). And, physicists, mathematicians and cosmologists continue to speculate on the nature of *nothing* (Battersby, 2013; Greene, 2004; Stewart, 2013). Thus, in the present as in the past, we recognise and grapple with the bifurcations and binary oppositions that characterise our ways of knowing and influence our ways of being. And, in the present as in the past, we occasionally glimpse the *oneness* that makes this *twoness* possible. But how are we to understand and relate such numerical metaphors in the context of human development and everyday wicked problems?

Dyads are ubiquitous. They permeate our vocabularies and discourses and frame the worlds we know and live in. For example, we orientate ourselves with dyads in our most mundane encounters with the spatial (left/right) and temporal worlds (past/future) and in our most intimate human relationships (love/hate; trust/caution). We orientate ourselves with dyads in relation to law (anarchy/order; justice/mercy), cultural policy (inclusion/exclusion; unity/diversity)

and political persuasion (conservative/liberal; freedom/control; autocracy/democracy). We orientate ourselves with dyads in professions such as medicine (mind/body; therapeutic/pharmacological), psychology (subjective/objective) and education (transmission/discovery). In philosophical encounters we orientate and identify ourselves with dyads (freewill/determinism; a posteriori/a priori; relative/absolute) and in theological and existential encounters, too (mythos/logos; faith/reason). Then there are the dyads that perhaps most define us in the twenty-first century (global/local; ecological/technological; nature/culture; natural/artificial; spirit/matter; conservation/development). And, through all of these mundane encounters with information and sophisticated pursuits of knowledge and wisdom, we continue to orientate ourselves with perennial dyads that give us place and purpose in the universe (birth/death; good/evil; hope/despair).

Likewise, dyadic *relationships* are ubiquitous. They appear in our dialogues as complements and in our diatribes as binary oppositions. In a plain sense, dyadic relationships appear as aphorisms, such as 'thinking in black and white', seeing the 'shades of grey', being 'one-eyed', 'sitting on the fence', 'having a foot in both camps', 'having a bet both ways', 'hanging in the balance' and 'walking a fine line'. We find relationships between dyadic constituents like general/particular expressed through aphorisms like 'can't see the wood for the trees' and 'the truth is in the detail'. The individual/collective dyad is expressed through aphorisms like 'too many cooks spoil the broth' and 'many hands make light work'. The unity/diversity dyad is expressed through aphorisms like 'divide and conquer', 'all for one and one for all' and 'unity in diversity'. Some of these relationships call us to separate and value one *against* the other. These relationships are binary oppositional. Others call us to synthesise one *with* the other. These relationships are dialectical. Still others call us to value the one *and* the other, even in opposition or apparent contradiction. These relationships are paradoxical.

Some commentators see the human predilection for dyadic thought, especially in its binary oppositional form, as being the source of much wickedness more literally understood. Exclusively *binary* oppositions between male and female, black and white, rich and poor and young and old have riven lives and societies from antiquity. Likewise, exclusively binary oppositions between nature and culture and matter and spirit have alienated many of us from our own planet and the possibility of purposeful existence. The onto-epistemological challenge is to identify and conceptualise life's wicked problems in a way that does not exacerbate them by forcing them into exclusively binary oppositional solutions or neglecting them altogether on the grounds that they have no solutions or (re)solvability at all. Exclusively binary oppositional relationships (i.e. either/or) can constrain and contain us, causing opposition, enmity and conflict, blinding us rather than binding us to the unity and continuity of the very thing we have divided. When infinite shades are forced into black or white, when acute degrees of difference are lost between poles or set to right angles and when infinity is squashed between an immovable beginning and end,

we can destroy the very truths we first sought to reveal. And yet without beginnings and endings and blacks and whites we may struggle to know or be anything at all.

My premise is that the way we perceive and describe (r)eality (e.g. as one, two, three ...) affects the construction and recognition of our most wicked problems and challenges: from how to raise our children to how *not* to destroy the planet. My thesis is simply that the study of common dyads offers a powerful insight into our everyday ways of knowing and being. My original approach to bi-relational development (i.e. BirD), to be explicated in Chapter 5 and illustrated and applied in subsequent chapters, is that our everyday ways of knowing and being can be powerfully located and understood in terms of the *creation, emergence, opposition, convergence, collapse* and *trans-positioning* of dyadic constituents. These bi-relational positions or dyadic relationships and dynamics offer some explanations for the complex challenges and wicked problems that arise in many different domains of knowledge and life.

Different dyads expose our most mundane and profound human concerns. And the changing nature of dyadic relationships during our lives and epochs reveals our deepest onto-epistemological questions: *how* do we know and *how* do we live? As a number of researchers in epistemological development appreciate, the ways we know are deeply and concretely linked to the ways we relate, love and hate. As Hofer (2002) notes, 'In our most mundane encounters with new information and in our most sophisticated pursuits of knowledge, we are influenced by the beliefs we hold about knowledge and knowing' (p. 3). Bawden (2010) concurs: 'The ability to act systemically in the world, with an acute appreciation of "wholeness", "interconnectedness" and "emergence", is a function of particular intellectual and value assumptions concerning the nature of reality, the nature of knowledge and of knowing, the nature of human nature' (p. 90). Reich, perhaps one of the most direct advocates for epistemological development beyond binary oppositional thinking towards relational and contextual reasoning, writes:

My claim is that, were they to use RCR, they would better their chances for improving personal relationships, tackling complex social problems such as getting people to follow good health habits, and dealing more effectively with social and political situations in strife-torn areas such as Northern Ireland, the Balkans, the Middle East, and elsewhere.

(2002, p. 6)

Kamerling and Gustavson describe similarly high stakes for exclusively binary oppositional approaches to wicked problems that require more relational and contextual (re)solutions:

Opposites collide in a battle between universal polarities where all peoples and culture reside. Two cultures project degrading and disparaging images

on one another. The west is seen as morally corrupt, socially degenerate, non-intellectual, untrustworthy, passive, ungodless, soulless, and materialistic. The Islamic world is viewed as fanatical, religious, backward, primitive, and aggressive. Issues clash, contradicting, locked in conviction, differing in position, struggling for dominance, unwilling to reconcile. Democracy versus theocracy, Feminism versus antifeminism, modernization versus traditionalism, secularism versus spirituality, and globalization versus anti-globalization, all creating a tension of exploding forces that are enacted on the current world stage.

(2012, p. 32)

The clash of civilisations has an equivalent, and perhaps even its seed, in the clash of opposites in our individual lives. I share the general hope of these authors that there are ways of knowing and being (i.e. *onto-epistemologies*) that can facilitate better ways of identifying and (re)solving wicked problems.

Bi-relational development (BirD)

To reiterate, my primary purpose is to identify archetypal dyads and dyadic relationships that characterise wicked problems. If there are different dyadic relationships (e.g. binary oppositional, dialectical, complementary) that reflect and affect our ways of knowing and being, as I propose, are there also developments between them? And, if so, to re-invoke Howard Gruber's (1986) perennial question of development: 'Which way is up?'

There is a picture book of opposites on my young son's bookshelf. Each illustrated page is dedicated to simple dyads like *happy/sad*, *hot/cold*, *short/tall* and *big/small*. Understandably, these are some of the dyads that first occupy a child's mind. Perhaps the most obvious and accessible dyadic relationship is *binary* and then *binary oppositional*. In early childhood at least, the mind seems relatively preconscious of degrees of difference between *hot-ter* and *cold-er*, the relativity of *big-ger* and *small-er*, the mytho-poetic and merismatic relationship between heaven and hell or the semantic interdependence between happy and sad. There is a refreshing immediacy and simplicity in the child's egocentric transposition between binary perceptions and reality. However, this simplicity is perhaps necessarily complicated by the discovery of other minds, which seems to relativise knowing (e.g. hot to you but cold to me), and/or technologies, which seem to objectivise knowing (e.g. thermometers). Here we find the seeds of opposition. I remember my first encounter with this particular opposition in a Year 8 science exam that asked, 'Is human skin a good judge of temperature? Yes or No?'. I briefly thought, 'compared with what?', wrote 'yes' and was marked wrong. The semantics and structure of such questions and their broader implications still interest me. My point is that there seems to be a cognitive-epistemic development that allows for progressive dexterity in the relation of dyadic constituents. To extend the physical metaphor, the coordination of

mental bifurcations, like the coordination of limbs, means that we tend to crawl before we can walk and walk before we can run. The trouble with development in the mental domain is that its bifurcations are harder to see than their physical analogues. It is easier to observe the physical transitions from crawling to walking to running than the transitions from pre-dyadic to pro-dyadic to post-dyadic knowing.

On my own bookshelf there is a copy of Albert Camus' (2005) philosophical treatise *The Myth of Sisyphus*, Nikolai Grozni's (2008) metaphysical odyssey *Turtle Feet*, Douglas Hofstadter's (1999) opus, *Godel, Escher, Bach* and a collection of Escher's illusive etchings (Ernst, 1995). In his early pages, Camus (2005) writes of the beginning and end of knowing: 'Beginning to think is beginning to be undermined' (p. 3). In his last pages, Grozni (2008) describes the end of his epistemological journey into Tibetan dialectics: 'Existence was nonexistence was existence was nonexistence. Right was wrong was right was wrong. The past was the present was the future was the past. Here was there was here and there' (pp. 317–18). Like many ancients before him and contemporaries with him, especially the masters of Zen, Grozni is struck by the seemingly absurd union and negation of opposites. The two become nought and one. Similarly, Hofstadter (1999) is profoundly affected by this strange loop that seems to simultaneously destroy and create consciousness, describing it as 'an interaction between levels in which the top level reaches back down towards the bottom level and influences it, while at the same time being itself determined by the bottom level' (p. 709). The two are entangled in one. I imagine, too, that Escher's similar realisation prompted many of his paradoxical self-referencing sketches and his observation that:

Anyone who plunges into infinity, in both time and space, further and further without stopping, needs fixed points, mileposts, for otherwise his movement is indistinguishable from standing still. There must be stars past which he shoots, beacons from which he can measure the distance he has traversed.

(Escher and Brigam, 1971, p. 40)

Here, *one* is a number that helps us to stand and *two* (i.e. fixed points, mileposts, beacons) is a number that helps us to measure and move between the otherwise un-navigable darkness between zero and infinity; or in existential terms, between nothing and everything. I have emphasised the most literal and esoteric ways to relate dyadic constituents early and late in life to suggest that there are developments, or at least different positions and dispositions for relating dyads, that have loose chronological affinities.

Perhaps these literary anecdotes contain generalisable truths about the development of knowledge and knowing from infancy to adulthood, both in individuals and cultures. This book is a small contribution and perhaps a continuance of this act of generalisation that can be found in many different

domains of knowing and being. Thus, I acknowledge my affinity with the general dyadic explorations of such literati and others closer to my own domain of knowing (i.e. educational psychology), such as Piaget (1970), Perry (1970) and Reich (2002). For example, Perry (1970) pioneered a theory of epistemological development and described the realisation of relativity after the stability of absolutism as the silent and most violent revolution of adult knowing. Similarly, I hope to show that there are bi-relational locations on the journey of knowing between infancy and old age, and that they are revealed in almost all modes of human expression, aspects of being and fields of knowledge. However, I also hope to problematise linear and teleological trajectories of development by identifying cyclical and chaotic dynamics of knowing and being.

Onto-epistemological development

Perhaps prematurely, I have used the term *onto-epistemological* to describe the type of human development with which I am most concerned. I use the term to express the inseparability and complementarity of our ways of knowing and being, and to focus an examination on the intersection between them. I owe the specific term to Karen Barad (2007), who uses it in recognition of the necessary entanglement of structure and content, and being and knowing in descriptions of individual and social 'reality/ies'. Wicked problems arise from the meeting of these individual and social realities, and I use the term to acknowledge the need for a paradigm that expresses the epistemological and ontological nature of such meetings. The term is defined elsewhere in compatible ways. Diversi and Moreira defend their *onto-epistemological stance* in a way that captures my own intention to recognise unity in separation, and to approach knowledge and theory 'in the flesh' of human experience:

We see the apparent dichotomies of mind and body, physical and metaphysical, object and subject, theory and method, as differentiations of one, all-encompassing, system: Being ... The mind and its interpretations of reality and being are not separate from the flesh but part of it – one perceives the world before any reflection takes place ... We are claiming that the dominant discourse in academia is still colonized by the ontological dualism of logical-positivism (that is, idealism versus materialism, mind versus body, fact versus fiction, science versus arts).

(2009, pp. 31–3)

DePryck's analysis acknowledges a similar entanglement between ontology and epistemology:

Ontological and epistemological questions cannot be dealt with independently from one another. Understanding the world, regardless of the

extent of our knowledge, implies an understanding of its structures and relations. These structures and relations in turn determine to what extent they can access themselves and thus also to what extent they can reflect upon themselves.

(1993, p. 19)

Likewise, Geerts and van der Tuin (2013) use *onto-epistemological* in the context of women's studies to acknowledge that 'being and knowing are always already entangled' (p. 171). Accordingly, this book is an attempt to co-develop the abstract theory and concrete lived experiences of BirD.

As a brief illustrative aside, my own journey towards the term *onto-epistemological* can itself be seen as a bi-relational development. While no book has an absolute beginning, this book 'began' almost 15 years ago, with a structural-cognitive analysis of religious fundamentalism, the topic of a masters thesis (Adam, 2003). To reflect on my own onto-epistemological development, it is fair to say that I was so deeply impressed with the explanatory power of structural developmental theories (e.g. Fowler, 1981; Reich, 2002) that I forgot to fully acknowledge the ontological events that gave rise to these epistemological explanations. Indeed, it was perhaps not until late into my doctoral thesis (Adam, 2008) that I was deeply struck by my neglect of the ontological dimension of my cognitive-epistemic analyses. I then found the clearest expression of this 'awakening from dogmatic slumbers' in Streib's (2001) complaint that structural developmental theories view cognitive-epistemic structures as the motor of human development and put the cart before the horse.

Thus, it is not without a sense of irony that I recognise my own onto-epistemological development towards the (re)union of *knowing* and *being* in the description of human development. This dyadic description contains the seed of this book's primary concern: that dyads and dyadic relationships offer powerful ways of understanding diverse trajectories of human knowing and being. Accordingly, I hope to offer an approach to wicked problems that acknowledges the entanglement between epistemology and ontology, though without 'mixing them up' completely.

Caveats

There are several caveats that are important to express at the outset of this book. First, I am well aware, and it may already be apparent, that an onto-epistemological project of this sort cannot escape the strange loops and dyadic structures it seeks to describe. As Lovejoy reflects in *The Revolt against Dualism*:

Man, in short, is by nature an epistemological animal . . . he will necessarily wish to know himself as knower, and therefore to understand the seeming mystery and challenging paradox of knowledge – the possibility which it implies of going abroad while keeping at home, the knower's apparent

transcendence of the existential limits within which he must yet, at every moment of his knowing, confess himself to be contained.

(1930, p. 12)

I will often be inescapably contained by the very dyadic structures I seek to step outside of to describe. My only defence, my only rationale, is that there is a peculiar type of freedom that lies as much in accepting one's inevitable constraints as it does in trying to escape them.

While there are innumerable poetic, mythic, artistic and esoteric treatments of dyadic relationships, there are few attempts to explore dyadic relationships with a reflexive awareness of the tensions, dualisms, paradoxes, complements and oppositions that govern that very exploration. For example, some explorations tend towards a spiritual-esoteric symmetry that is arguably unmindful or at least too disentangled from the material complexity, asymmetry and entropy revealed by the natural sciences. Conversely, other explorations tend towards a naturalistic asymmetry that is similarly unmindful or disentangled from the relative simplicity, symmetry and teleology revealed by the cosmological sciences. A book about dyads is always going to have a disciplinary identity crisis, though it is a crisis I intend to at least acknowledge and explore. Accordingly, the onto-epistemological task is not to destroy the dyadic construct altogether; rather, it is to expand the repertoire of relationships between polarities beyond mere opposition so that we may first grasp and then work on wicked problems with two hands working as one. Thus, the reader will find herein a combination of prosaic and poetic, mythic and literal, pure and applied and concrete and abstract attempts to communicate the dyads and dyadic relationships that reflect and construct wicked problems. However, I recognise that in the finite pages of a book this division of focus may somewhat weaken two parts to strengthen a whole.

While there are many more limitations that I intend to acknowledge throughout this book, perhaps the limitation I feel most obliged to acknowledge at the outset is the level of generalisation that there is in introductions – not just an introductory chapter but a whole book as an introduction to a particular approach. No doubt, further and finer analyses will find that I have assumed too much structural similarity between some dissimilar dyads and too much symmetry between some asymmetrical developments. Nonetheless, I hope to have done enough thinking, living and researching to show that more can be done, and more is worth doing, in understanding the bi-relational dimension of wicked problems.

Overview of chapters

In summary, this book has three premises. The first is that the common appearance of dyads in a particular domain of knowledge can help us to recognise its definitive wicked problems. For example, the educator will wrestle with nature

and nurture, the physician with mind and body, the politician with liberal and conservative, the architect with pragmatics and aesthetics, the philosopher with a priori and a posteriori, the psychologist with subjective and objective, the physicist with relative and universal, the theologian with immanent and transcendent, the scientist with data and interpretation and the civilisation with order and chaos. Of course, there is also a sense in which every one of us will wrestle with them all.

The second premise is that dyadic relationships and dynamics provide a powerful framework for understanding how wicked problems can be approached and exacerbated in different ways. For example, one educator may leave students to their nature and disregard their nurture; another may nurture their students without regarding their nature. One physician may seek to heal the mind with pharmacological treatments; another may seek to heal the body only through the mind. At one time they may oppose each other; at other times they may unite.

The third premise is that epistemologies (i.e. ways of knowing) and ontologies (i.e. ways of being), as all dyads, are entangled like chicken and egg in the production of wicked problems. I hope to reflect this entanglement by infusing epistemological theory with lived experiences, especially in the second part of this book. Theories are neat and human experiences are messy, but they are nonetheless inextricably linked.

This book is structured using three parts that respectively offer a theory, illustrations and educational applications of BirD. Specifically, Part 1 provides a general introduction to key concepts, a theoretical background and detailed description of BirD. Part 2 provides illustrations of BirD across a wide range of dyads representing different wicked problems. And Part 3 offers some general and specific applications of BirD as a bi-relational approach to understanding wicked problems in the context of formal education. The following paragraphs provide more detail on the individual chapters within these parts.

Part 1: theory

So far, this chapter has sought to introduce the book's overarching concepts, including *dyads* and *dyadic relationships*, *wicked problems*, *onto-epistemology* and *BirD*. The aim of Chapter 2 is to establish the ubiquity of dyads and dyadic relationships apparent in everyday wicked problems. Accordingly, Chapter 2 provides an illustrative review of dyads and dyadic relationships in literature from different domains of knowledge.

Having identified the structure of dyads in context in Chapter 2, Chapter 3 discusses the origins of dyads and the classification of different types of dyads. The related discussion further reveals why BirD and the reconciliation of opposites is central to the recognition and (re)solution of wicked problems and a worthy topic of attention in formal education.

Chapter 4 prepares the way for a bi-relational theory of development (i.e. BirD) as part extension, rejection and integration of some existing theories of

development. Specifically, the chapter positions BirD in relation to a selection of closely related theories, including: Piaget's (1970) stages of intellectual development, Perry's (1970) stages of epistemological development, King and Kitchener's (1994) reflective judgement model, Baxter Magolda's (1992) epistemological reflection model; Kuhn and Weinstock's (2002) levels of epistemological understanding, Basseches' (1984) and Riegel's (1979) dialectical thinking and Reich's (2002) levels of relational and contextual reasoning. The chapter concludes with a general discussion of the nature of a bi-relational theory as preparation for a more detailed description of the book's specific bi-relational theory (i.e. BirD) in Chapter 5.

Chapter 5 offers an introductory description of BirD as an approach to recognising and (re)solving wicked problems. BirD is not so much an attempt to defend dyadic structure (i.e. the division of reality into two) as it is an attempt to describe such divisions, their effects, developments, intra-relations and interrelations with non-dyadic positions. The chapter offers visual and symbolic representations of BirD's archetypal regions, positions, trajectories and dynamics. It also provides brief illustrations and some general metaphors to illuminate BirD as a theory that crosses boundaries between formal and postformal logics, linear and non-linear understandings of development and divided and united notions of *self*. The chapter then provides descriptions of BirD's key relational dynamics that describe and create diverse trajectories of knowing and being. Together with BirD's archetypal positions, regions and trajectories, these dynamics provide an interpretive framework for understanding the illustrations and applications of Parts 2 and 3 respectively.

Part 2: illustrations

The purpose of Part 2 is to illustrate the theory in relation to wicked problems. These illustrations use BirD's archetypal positions and dynamics to understand wicked problems as they are manifested in individual lives and on global stages. To this end, Chapter 6 offers an illustrative analysis of a collection of short dyadic narratives written in response to a semi-structured questionnaire. The narratives summarise participants' epistemological beliefs, reflections and related life experiences in relation to a dyad that they find most salient. For example, the analysis uses participant extracts to illustrate onto-epistemological trajectories in relation to dyads such as despair/hope, stability/change, feeling/thinking, future/past, teaching/learning, mind/body and faith/reason. Accordingly, the chapter also illustrates the ubiquity of dyadic constructs in everyday wicked problems.

Chapters 7, 8 and 9 provide general discussions of three interrelated wicked problems. Chapter 7 presents a bi-relational discussion of socio-cultural problems in relation to dyads such as global/local and traditional/modern. Chapter 8 presents a bi-relational discussion of socio-ecological problems in relation to the nature/culture dyad. Chapter 9 presents a bi-relational approach

to socio-religious problems in relation to the spiritual/material and faith/reason dyads. In plain terms, the interrelated problems presented in these chapters reflect human-to-human relationships, human-to-earth relationships and human-to-cosmos relationships. Collectively, these chapters provide a platform for considering the role of bi-relational education in the identification and (re) solution of wicked problems.

Part 3: applications

Part 3 considers some practical applications of a bi-relational approach in the context of formal education. Chapter 10 offers a general discussion of the pedagogical and educational applications of BirD, along with a series of specific bi-relational strategies for use in formal educational contexts.

Chapter 11 provides bi-relational analyses of two teachers' narratives to illustrate wicked pedagogical problems in formal education. The first explores a dance teacher's understanding of the mind/body dyad in relation to her ways of teaching. The second explores a mathematics teacher's understanding of the concrete/abstract dyad in relation to his ways of teaching. Together, these explorations highlight the reality of bi-relational development and its implicit influence in formal education.

Finally, Chapter 12 offers a condensed summary of the book and a discussion of future directions for its bi-relational approach to onto-epistemological development and wicked problems. Its final section revisits the 'serious riddle' posed at the beginning of the book to once more affirm the bi-relational nature of human development and need to reconcile opposites in the (re)solution of wicked problems.

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